

# Forensic Toxicology DUI Services Manual 2007



Utah Department of Health

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## ***Mission***

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The Bureau of Forensic Toxicology (BFT) of the Utah Public Health Laboratories will provide quality forensic toxicology services to the criminal justice community and the Office of the Medical Examiner in Utah.

## ***Quality Assurance Statement***

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The UPHL Bureau of Forensic Toxicology is committed to providing quality services to our clients. To accomplish this, a quality system has been established to provide clients with the continued confidence that laboratory results are and remain accurate, impartial, and relevant.

The following objectives of the quality system are supported and understood by the management and staff of the UPHL Bureau of Forensic Toxicology:

- To provide sound technical methods and procedures utilizing appropriate instruments and equipment;
- To provide results that are accurate, valid, defensible, and pertinent to the needs of the criminal justice community;
- To provide relevant, professional, and impartial testimony in judicial proceedings;
- To provide continuing education and support to all analysts through a professional development program;
- To demonstrate - through documentation - that the quality control procedures are being conducted; and
- To provide a foundation for pursuing the requirements of laboratory accreditation.

## Overview

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The Bureau of Forensic Toxicology performs qualitative and quantitative chemical analyses of tissues and body fluids to determine the presence of drugs and other toxic substances. Samples are submitted to the laboratory by the Office of the Medical Examiner (OME) and by law enforcement agencies statewide.

Toxicology results are used to:

- assist the OME in determining cause and manner of death (per [Utah Code Section 26-4-7](#)); and
- provide information in cases involving suspects driving under the influence (DUI) of alcohol and/or drugs (per [Utah Code Section 41-6a-502](#)), automobile homicides (per [Utah Code Section 76-5-207](#)), and other crimes.

The Bureau of Forensic Toxicology staff is comprised of 2 laboratory technicians, 8 analysts, and 2 management personnel.

## Specimen Submission Requirements

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The BFT Laboratory shall reject specimens if the submitting agency fails to:

- (1) include a typed DUI Toxicology Laboratory Analysis Request Form with all the required fields completed; and
- (2) meet all other requirements for specimen submission (see below).

### *Specimen Collection*

To request blood and urine collection kits, email [forensictox@utah.gov](mailto:forensictox@utah.gov) or call 584-8400. For more information on the contents of specimen collection kits, see [Appendix A](#).

Each law enforcement agency is responsible for utilizing trained phlebotomists/blood technicians to collect specimens in accordance with universal safety precautions. To obtain information on blood technician certification, contact the Bureau of Laboratory Improvement of the Utah Public Health Laboratories at 584-8400. Guidelines for forensic specimen collection are included in [Appendix B](#).

Minimum Specimen Volume Requirements For Testing	
Blood alcohol	5 ml (one 10 ml gray top tube)
Blood drug screen	20 ml (two 10 ml gray top tubes)
Urine drug screen	30 ml (one 90 ml plastic bottle)

Recommendations:

- Collect blood samples if it is important to demonstrate impairment and/or if it is suspected that a drug was taken in the past 24 hours.
- Collect urine samples if it will suffice to demonstrate past use and/or it is suspected that a drug was taken over 24 hours before arrest.

### *Specimen Information*

Using water-resistant ink, each specimen container must be individually labeled with the following information:

- Name of the subject (Last Name, First Name)
- Your agency case number

A tamper-resistant seal, provided in the collection kit, must be placed across the stopper or cap of the specimen container; the person sealing the specimen container must initial and date the seal. Identification labels for blood tubes must NOT be used to seal the tube.

The DUI Toxicology Analysis Request Form must be typed, completed, and included with the specimen; the form may be found on the [BFT website](#). Ensure that the chain of custody section is completed prior to submitting the sample. For specimens submitted by mail, the chain of custody must be completed as illustrated in the following example:

CHAIN OF CUSTODY			
From	To	Date	Time
* Name: Mark Jones * Agency: Wasatch Front PD Title: Officer	* Name: US mail * Agency: N/A Title: N/A	1/1/2005	10:00

It is helpful to provide background information such as breath alcohol test results, offense, history of drugs or medications, etc. Please limit analysis requests to suspected drugs or drug categories. Unnecessary additional requests are costly and prevent the laboratory from reporting case results in a timely manner.

For non-DUI offenses, always call the laboratory prior to submitting a sample so we can ensure appropriate services/testing are available for the case.

### *Specimen Preservation*

Gray top blood collection tubes contain both a preservative (100 mg sodium fluoride) and an anticoagulant (20 mg potassium oxalate). The preservative helps prevent deterioration of the specimen, including changes in alcohol concentration and the breakdown of cocaine. The anticoagulant prevents the sample from clotting.

Samples must be kept secure and refrigerated until shipped or delivered to the laboratory.

### *Specimen Shipment*

Mailed specimens must meet blood borne pathogen shipping requirements and be packaged to fully contain leakage/spillage in accordance with applicable federal laws (PHS 42 CFR Part 72, rule 173.199). These measures are necessary to protect your agency personnel, postal/delivery personnel, and Utah Public Health Laboratories staff from exposure to disease in the event that the specimen tubes leak or break in transit. Do NOT ship needles or other blood collection equipment to the laboratory. Leaky containers will NOT be accepted for analysis.

### *Inner Container*

Each sealed and labeled blood specimen tube must be placed in the cushioned receptacles provided in the blood collection kit. Polyethylene urine containers must be placed in the sealable plastic pouches provided in the urine collection kits. The inner container must contain sufficient absorbent material to absorb the entire liquid contents of the collection tube/container in the event of breakage/leaking during transit.

These “inner containers” must be sealed and initialed.

### *Outer Shipping Box*

Each container is to be placed in a crush-proof shipping container made of cardboard. These “outer containers” must be sealed and initialed. Biohazard labels must be affixed to the exterior.

### *Specimen Storage and Disposal*

By default, specimens are routinely retained in the laboratory’s evidence refrigerator for 5 weeks after the final report is issued. Should an agency require additional testing, the request must be made during this time period.

Specimens will be discarded 5 weeks after the final report is issued, unless the agency has specifically requested that a sample be saved OR the agency has provided a written directive to return all its specimens by mail after analyses are completed.

## ***Analytical Results***

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The BFT laboratory provides final reports to the submitting law enforcement officer via U. S. mail. Please ensure that reports are distributed in a timely manner to all other involved parties (e.g., records department, prosecutor’s office, etc.).

Preliminary reports are issued to the Driver License Division and will be available to officers at the driver license hearing. Please do not request additional preliminary reports be issued to you separately. Note that preliminary reports provide only presumptive results and drugs may not be confirmed upon further testing.

### *Blood*

With the exception of alcohol, drug levels in blood provide limited information in assessing the degree of impairment in DUI cases. There is insufficient scientific data relating the blood levels of many drugs to the degree of impairment. In accordance with DRE training, toxicologist testimony is based on the 3 legged-stool approach: observations of poor driving; poor field sobriety test performance, and the presence of a drug or metabolite consistent with the subject's symptomology.

An opinion of driving impairment based solely on a quantitative level of a drug or drugs is scientifically unfounded and possibly unethical. For more information, read “[Monograph: Drug Quantitation in Biological Specimens for DUI cases](#)” on the [BFT website](#).

## *Urine*

Drug presence in urine samples serves only to establish history of use. Due to the variability of absorption, distribution, metabolism, excretion, and elimination of drugs between individuals, no correlation can be made between the presence of a drug in the urine and levels of that drug in blood. Furthermore, presence of a drug in the urine cannot be related to the degree of impairment.

## *Analysis Methods*

Analysis Methods Employed in the BFT Laboratory	
ELISA	Enzyme Linked Immunosorbent Assay
GC/NPD	Gas Chromatography/Nitrogen Phosphorus Detector
GC/MS	Gas Chromatography/Mass Spectrometer
HS/GC	Headspace Gas Chromatography

For more information on these methods, visit the [BFT website](#).

## Testing Panels

Following is a list of all the drugs included in our testing panels. The BFT services are subject to change depending on resources and/or changing drug patterns within the state. For drugs not included in these panels, specimens may be sent to a reference laboratory at the request of the submitting agency (see Reference Laboratories section).

**Unless extenuating circumstances are indicated on the DUI Toxicology Laboratory Analysis Request Form, no further testing is conducted on specimens resulting in blood ethanol > 0.10 grams/100ml.**

Volatiles Panel					
Method: HS/GC					
Drug Class	Drugs	Cut off value (grams/100ml or %)		General Detection Times	
		Blood	Urine	Blood	Urine
Volatiles	Ethanol	0.01	0.01	3-12 hours	
	Acetone	0.02	0.02	n/a	n/a
	Isopropanol				
	Methanol				

Drugs of Abuse Panel			
Methods: ELISA, GC/MS			
Drug Class	Drugs	General Detection Times	
		Blood	Urine
Amphetamines	Amphetamine	1 - 3 days	3 - 5 days
	Methamphetamine		
	MDMA/MDA		
	Phentermine	n/a	n/a
	Ephedrine/ Pseudoephedrine	n/a	n/a
Cannabinoids (Marijuana)	THC	Infrequent user: 1 - 4 hours Frequent user: 3 - 6 hours	Not found in urine
	THC-COOH (metabolite)	Infrequent user: 2-3+ days Frequent user: 2+ weeks	Infrequent user: 2 weeks Frequent user: 3 - 6 weeks
Cocaine	Cocaine	5 hours (will break down in unrefrigerated blood)	12 hours
	Benzoyllecgonine (metabolite)	varies	2 - 4 days
Opiates	Morphine	1 - 4 hours	3 - 4 days



Prescription Drug and OTC Drug Panel			
Method: GC/MS			
Drug Class	Drugs	General Detection Times	
		Blood	Urine
Rx drugs	Alprazolam (e.g., Xanax)	In general, prescription and over-the-counter drugs can be detected in blood within 4-24 hours, and in urine for 2-4 days.	
	Amitriptyline: (Elavil)		
	Butalbital (Fioricet)		
	Carbamazepine (e.g., Tegretol)		
	Carisoprodol (Soma)		
	Chlorpheniramine (e.g., Chlor-trimeton, Triaminic)		
	Codeine (Brontex)		
	Cyclobenzaprine (Flexeril)		
	Dextromethorphan (e.g., in Robitussin)		
	Diazepam (e.g., Valium):		
	Diphenhydramine (Nytol, Sleep Aid)		
	Doxylamine (e.g., Unisom)		
	Hydrocodone (e.g., Lortab)		
	Meperidine (Demerol)		
	Meprobamate (generic only)		
	Methadone (Methadose)		
	Nordiazepam:		
	Norpropoxyphene		
	Nortriptyline (Aventil, Pamelor)		
	Oxycodone		
	Phenobarbital (e.g., Luminal):		
	Phenytoin		
	Promethazine (e.g., Phenergan)		
	Propoxyphene		
	Tramadol (Ultram)		
	Trazodone (Desyrel)		
	Zolpidem (Ambien)		

### ***Reference Laboratories***

For drugs not included in the BFT testing panels above, specimens may be sent to a reference laboratory at the expense of the submitting agency. When requesting reference laboratory testing, please provide a PO number to cover the cost of analysis and shipping and handling.

## ***Appendix A: Specimen Collection Kits***

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Blood collection kits include:
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| <ul style="list-style-type: none"><li>▪ 2 gray top blood tubes with adhesive labels</li><li>▪ 1 needle</li><li>▪ 1 needle holder</li><li>▪ consent form cards</li><li>▪ a Povidone-Iodine prep pad</li><li>▪ absorbent material</li><li>▪ evidence tape (for sealing)</li><li>▪ a sealable inner container with labels for chain of custody</li><li>▪ a crush-proof shipping container</li></ul> |
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Urine collection kits include:
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| <ul style="list-style-type: none"><li>▪ One urine collection cup</li><li>▪ One 90-ml plastic specimen container</li><li>▪ Adhesive label and seal</li><li>▪ a plastic sealable pouch</li><li>▪ absorbent material</li><li>▪ a crush-proof shipping container</li></ul> |
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Upon request, contractors who perform specimen collection for agencies along the Wasatch Front will be provided with bulk collection kits. Bulk blood collection kits include gray top blood tubes, needles, and evidence tape.

The BFT does NOT supply the following:

- Tourniquets, gloves, gauze, bandages
- soap and water solution used to disinfect the venipuncture site.
- a container for mailing or delivering samples collected using bulk supplies
- a preservation or security protocol to be applied on samples prior to being submitted to the laboratory
- a sharps container for proper disposal of needles.

## ***Appendix B: Guidelines for Forensic Specimen Collection***

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Proper blood collection techniques should be followed to minimize health risk to subject and collector. Gloves should be worn at all times during the collection process. Venipuncture collection must be observed by the police officer.

1. Identify the subject correctly and obtain consent.
2. Apply the tourniquet 3-4 inches above the selected puncture site. Do not place too tightly or leave on more than 2 minutes.
3. Choose a collection site. The most common sites are the veins in the antecubital space of the arms.
4. Use Povidone-Iodine prep pad to cleanse skin at collection site. If prep pad is unavailable, cleanse skin with gauze and a soap/water solution. When making the soap/water solution, use a soap that does not contain any alcohol.
5. Draw blood with vacutainer needle. To prevent loss of alcohol, the collection tube should be filled, if possible, to a level that minimizes the air space above the specimen.
6. Add sample to gray top blood tube by vacutainer method. Do not remove stoppers.
7. To insure proper mixing of the anticoagulants, slowly invert the tubes completely at least five times. Do not shake vigorously.
8. Apply a sterile bandage to the site.
9. Label specimen tubes and obtain officer's initials on the tube(s).
10. Place an evidence seal across the top the tube and initial.
11. Properly dispose of needle, needle holder, and gauze. Do not discard in an area where these items could contaminate unused blood collection equipment. Do not ship needles or needle holder with the specimen.
12. Under the officer's direction, complete the DUI Toxicology Analysis Request Form.
13. Prepare the specimens for submission per BFT instructions.